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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,665	09/27/2004	Stanislav Vasilyevich Adamenko	206,590	2363
38137 7590 05/18/2007 ABELMAN, FRAYNE & SCHWAB 666 THIRD AVENUE, 10TH FLOOR NEW YORK, NY 10017			EXAMINER DUDNIKOV, VADIM	
			ART UNIT 3663	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/509,665

Applicant(s)

ADAMENKO, STANISLAV
VASILYEVICH

Examiner

Vadim Dudnikov

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) 1-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 September 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 6/28/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statements filed 06/28/2005 and all other information or that portion which caused it to be listed has been placed in the application file, the information has been considered. Enclosed please find a signed copy of Form PTO-1449.

Abstract

2. The abstract of the disclosure is objected to because of the following informality: the abstract exceeds 150 words.

See 37 CFR 1.72 (b).

Appropriate corrections are required.

b) A brief abstract of the technical disclosure in the specification must commence on a separate sheet, preferably following the claims, under the heading "Abstract" or "Abstract of the Disclosure." The sheet or sheets presenting the abstract may not include other parts of the application or other material. The abstract in an application filed under 35 U.S.C. 111 may not exceed 150 words in length. The purpose of the abstract is to enable the United States Patent and Trademark Office and the public

generally to determine quickly from a cursory inspection the nature and gist of the technical disclosure

The abstract of the disclosure is objected to for not corresponding to a possible use of the disclosed invention, because in the written description of the invention neither a well established nor credible utility is disclosed: that the disclosed system does not provide the condition "to compress a substantial portion of the target substance to a **superdense** state" ("a **superdense** state in which **pycnonuclear** processes and inertial confinement **fusion** (ICF hereafter) may proceed...", "at which state a substantial portion of the target substance transforms into **electron-nuclear** and electron-nucleonic plasma"). The amendment of the abstract is required to directly correspond to a possible use of the disclosed invention. Correction is required.

Abstract should not refer to purported or speculative application of invention.

See MPEP § 608.01(b).

Drawings

3. The drawings do not show every feature described within the specification and the relationships therein in order to facilitate understanding of the material in which applicant considers his invention. Drawings are objected to for not disclosing "dielectric end element having the perimeter of the rear end embracing the perimeter of said rod at least in the plane perpendicular to the axis of symmetry of the cathode as the whole with a continuous gap", presented in the claims 23, 31 and 38.

Corrected drawings in compliance with 37 CFR 1.121 (d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance. No new matter should be introduced.

Specification

4. Specification is objected to because in the specification the following is not clearly disclosed: "dielectric end element having the perimeter of the rear end embracing the perimeter of said rod at least in the plane perpendicular to the axis of symmetry of the cathode as the whole with a continuous gap", presented in the claims 23, 31 and 38".

Correction of specification is needed. No new matter should be introduced.

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. The specification is objected to under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. As stated in MPEP § 2164.03, the amount of guidance or direction needed to enable the invention is inversely related to the amount of knowledge in the state of the art as well as the predictability in the art. In *re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970). Other factors contributing to lack of enablement may include the breadth of the claims, the nature of the invention, the existence of working examples and the quantity of experimentation needed to make or use the invention based on the content of the disclosure (see MPEP § 264.01(a)).

The art of the present invention (i.e., to compress a substantial portion of the target substance to a **superdense state**", ("a **superdense state** in which **pycnonuclear** processes and inertial confinement **fusion** (ICF hereafter) may proceed...", "at which state a substantial portion of the target substance transforms into **electron-nuclear** and **electron-nucleonic plasma**") is so new and in initial stage of development that it cannot be considered to have a body of knowledge associated with it, much less predictability of results (see *Chiton Corp. v. Genentech Inc.*, 363 F.3d 1247, 1254, 70 USPQ 2d 1321, 1326 (Fed. Cir. 2004)).

Applicant has not provided well established data regarding the invention utility supporting applicant's claims: "[0004] This technology is intended practically for **transmutation** of atomic nuclei of certain chemical elements into nuclei of other chemical elements with the purpose of:; [0005] Experimentally obtaining preferably

stable isotopes of chemical elements including synthesis of **stable transuranides**;
[0006] **Reprocessing radioactive waste** containing long-lived isotopes into materials containing short-lived isotopes and/or stable isotopes, which is particularly important in decontamination of used gamma-ray sources, e.g., based on radioactive isotopes of cobalt widely used in industry and medicine. [0007] In future, this method may be useful for obtaining energy by the ICF with utilization of preferably solid target” .

These capabilities of the se claims are not verified by independent experiments, but rather has only presented applicant s results with some speculations and assumptions.

Since Applicant has not well established the operability of the presently claimed invention, it is considered that the invention is lacking in utility.

Given the state of the art as discussed herein, it is unreasonable to expect one skilled in the art to be able to make and use the claimed invention without undue experimentation.

The claimed invention as a whole must be **useful** and accomplish a **practical** application. That is, it must produce a “useful, concrete and tangible result.” State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02. The purpose of this requirement to limit patent protection to inventions that possess a certain level of “real world” value,

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as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96 (1966)); In re Fisher, 421 3d 1365, 76 USPQ2d 1225 (Fed. Cir. 2005); In re Ziegler, 992 F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)).

2164.01(a) Undue Experimentation Factors

There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue." These factors include, but are not limited to:

(A) The breadth of the claims- *is doubtful, because the invention alleges to solve a "nuclear transmutation problem, **stable transuranide** production and energy production through inertial fusion and a "pyncnonuclear process". ("Pyncnonuclear process" is such a recombinational interaction ('cold' in particular) between components of electron-nuclear and electron-nucleonic plasma of the target substance compressed to a superdense state causing at least the target isotopic composition change); and hence applicant's claimed invention spans both fundamental physics at a non-established stage and the application thereof thus being non credible* (K. Zelenskii et al., "Effects of electron

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impact on the anode of pulsed X-ray tube", Sov. Phys.-Tech. Phys., v.13, No 9, 1284-1289, 1969);

(B) The nature of the invention- *there is an apparatus and method for nuclear transmutation, **stable transuranide** production and energy production through "pyncnonuclear process"; the nature of the invention as disclosed thus involves very drastic change of hypotheses in the nuclear physics* (K. Zelenskii et al., "Effects of electron impact on the anode of pulsed X-ray tube", Sov. Phys.-Tech. Phys., v.13, No 9, 1284-1289, 1969);

(C) The state of the prior art- *effects claimed by applicant's were not observed in many experiments with near similar condition of rod-pinch anode irradiation by relativistic electrons* (K. Zelenskii et al., "Effects of electron impact on the anode of pulsed X-ray tube", Sov. Phys.-Tech. Phys., v.13, No 9, 1284-1289, 1969);

(D) The level of one of ordinary skill- *there is no experience for production for anomaly nuclear transmutation, **stable transuranide** production and energy production through "pyncnonuclear process* (K. Zelenskii et al., "Effects of electron impact on the anode of pulsed X-ray tube", Sov. Phys.-Tech. Phys., v.13, No 9, 1284-1289, 1969);

(E) The level of predictability in the art- *a possibility for nuclear transmutation, stable transuranide production and energy production through "pycnonuclear process" and the target isotopic composition change as claimed are likely impossible* (K. Zelenskii et al., "Effects of electron impact on the anode of pulsed X-ray tube", Sov. Phys.-Tech. Phys., v.13, No 9, 1284-1289, 1969);

(F) The amount of direction provided by the inventor- *is wholly insufficient because, inventor presented assumptions, speculations related to stable transuranides are not conformed in independent experiments.*

G) The existence of working examples- ***example exist*** but realization of ***"pycnonuclear process"*** determined by applicant as a such *recombinational interaction ('cold' in particular) between components of electron-nuclear and electron-nucleonic plasma of the target substance compressed to a superdense state causing at least the target isotopic composition change does not have independent confirmations.*

(H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure- ***need undue experimentation and can have likely negative and unpredictable results.***

Claim Objections

7. Claim **23** is objected to because of the following informality:

on page 3, in line 2 replace —focussing— to —focusing— after “self”.

Appropriate corrections are required.

The following is a quotation from the relevant sections of the Patent Rules under 37 C.F.R. 1.75 that form the basis of the objection made in this office action.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims **23**, **31** and **38** rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention “dielectric end element having the perimeter of the rear end embracing the perimeter of said rod at least in the plane perpendicular to the axis of symmetry of the cathode as the whole with a continuous gap”.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims **23-41** are rejected under 35 U.S.C. 102(b) as being anticipated by Mahaffey, U.S. Patent # 4,213,073 ('073).

As best as can be understood because of the indefiniteness as discussed above, on independent claim **23**, '073 discloses: A method of compressing a substance by impact utilizing a relativistic vacuum diode (column 1, lines 5, column 3, lines 28-35) having an axisymmetric vacuum chamber with current-conducting walls (18 in Fig. 3, column 3, lines 18-20), an axisymmetric plasma cathode (20 in Fig. 3, column 3, lines 18-39) and an axisymmetric anode-enhancer (14 in Fig. 3, column 3, lines 18-39) , including: producing a target in the shape of an axisymmetric part made of a condensed substance that functions as at least a part of the anode-enhancer ("suitable target", not shown, column 4, lines 15-30), producing a plasma cathode in the form of a current-conducting rod comprising a dielectric end element (column 1, lines 19, column 2, lines 42-63, column 3, lines 1-63) having the perimeter of the rear end embracing the perimeter of said rod at least in the plane perpendicular to the axis of symmetry of the cathode as the whole with a continuous gap (column 2, lines 60-67), and the area of the

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emitting surface being greater than the maximum cross-section area of the anode enhancer, placing said cathode inside the vacuum chamber of the relativistic vacuum diode in such position that the axes of symmetry of this cathode and this vacuum chamber practically coincide (Fig. 3, column 3, lines 18-62), placing the anode-enhancer in the vacuum chamber of the relativistic vacuum diode practically on the same geometric axis with the plasma cathode with such a gap that the center of curvature of the working surface of the anode-enhancer is located inside the focal space of the collectively self-focusing electron beam

pulse discharge of a high-voltage power source via the relativistic vacuum diode to generate an electron beam with an electron energy not smaller than 0.2 MeV (column 3, lines 27-39) , and acting upon the surface of the anode-enhancer by said beam in an electron collectively self-focusing mode (column 4, lines 15-30) with the current density not smaller than 10^6 A/cm² and pulse duration not greater than 100 ns (column 3, lines 27-39).

On claim **24** '073 discloses: A method as defined in claim 23, wherein used in the relativistic vacuum diode plasma cathode has a pointed current-conducting rod (column 2, lines 60-67, column 4, lines 63-68), the dielectric end element of this cathode (column 1, lines 18-21) is provided with an opening for setting on said rod, and the setting part of said rod together with the pointed end is located inside the opening.

On claim **25** '073 discloses: A method as defined in claim 23, wherein the target is formed in the shape of an insert into the central part of the RVD anode-enhancer (column 4, lines 15-29), the diameter of said insert is chosen in the range of 0.05 to 0.2 of the maximum cross-sectional dimension (d_{\max}) of the anode-enhancer (column 4, lines 15-29).

On claim **26** '073 discloses: A method as defined in claim 23, wherein at least that part of the anode-enhancer, which is directed to the plasma cathode, is spheroidally formed prior to mounting in the relativistic vacuum diode (column 4, lines 57-62, column 5, lines 1-6).

On claim **27** '073 discloses: A method as defined in claim 25, wherein the target is formed in the shape of a spheroidal body tightly fixed inside the anode-enhancer in such a way that the centers of the inner and outer spheroids practically coincide (column 4, lines 57-62, column 5, lines 1-6).

On claim **28** '073 discloses: A method as defined in claim 23, wherein the anode-enhancer surface is acted upon by an electron beam having the electron energy up to 1.5 MeV, current density not greater than 10^8 A/cm² and duration not greater than 50 ns (column 3, lines 24-39).

On claim **29** '073 discloses: A method as defined in claim 28, wherein the current density of the electron beam is not greater than 10^7 A/cm². (column 3, lines 24-39).

On claim **30** '073 discloses: A method as defined in claim 23, wherein the residual pressure in the vacuum chamber of the relativistic vacuum diode is maintained at the level not greater than 0.1 Pa (column 3, lines 18-20).

As best as can be understood because of the indefiniteness as discussed above, on claim **31** '073 discloses: A device for impact compression of a substance, which is based on relativistic vacuum diode and is comprised of: a strong gas-tight housing (18 in Fig. 3, column 3, lines 18-27) a part of which is made of a current-conducting material shaped in axial symmetry to confine a vacuum chamber, and an axisymmetric plasma cathode (20 in Fig. 3, column 3, lines 18-39) in the form of a current-conducting rod with a dielectric end element (column 1, lines 18-23, column 2, lines 42-63, column 3, lines 1-63) having the perimeter of the rear end embracing the perimeter of said rod at least in the plane perpendicular to the axis of symmetry of said cathode with a continuous gap, an axisymmetric anode-enhancer at least a part of which is designed to be a target (column 4, lines 15-29, lines 53-63) for impact compression, said anode-enhancer having the maximum cross-section area smaller than the area of the emitting surface of said cathode and being mounted in said vacuum chamber with a gap practically on the same geometric axis of with said cathode, and a

pulsed high-voltage power source connected at least to said plasma cathode (column 4, lines 63-68), at least one of said relativistic vacuum diode electrodes being provided with means for adjusting the gap between the electrodes (column 3, lines 1-39), and the distance from the common geometric axis of said electrodes to the inner side of the current-conducting wall of said vacuum chamber being greater than $50 d_{\max}$ (column 3, lines 18-39), where d_{\max} is a maximum cross-sectional dimension of the said anode-enhancer.

On claim **32** '073 discloses: A device as defined in claim 31, wherein the current-conducting rod of said plasma cathode is pointed and the dielectric end element thereof is provided with an opening for setting on said rod the setting part of which is located inside said opening together with the pointed end (column 3, lines 18-39).

On claim **33** '073 discloses: A device as defined in claim 31, wherein said anode-enhancer has a circular shape in the cross section and is completely produced of a material to be transmuted that is current-conducting in its main mass (column 3, lines 18-39, column 4, lines 15-29).

On claim **34** '073 discloses: A device as defined in claim 31, wherein said anode-enhancer is made composite and comprises at least a one-layer solid shell and an inserted target tightly embraced by this shell, said target being in the shape of a body of revolution and made of an arbitrary condensed material with a diameter within the

range of (0.05-0.2) d_{max} , where d_{max} is a maximum cross-sectional dimension of the anode-enhancer (column 4, lines 15-29, lines 57-62).

On claim **35** '073 discloses: 35. (New) A device as defined in claim 31, wherein at least one shield preferably of current-conducting material is mounted in the tail part of said anode-enhancer (column 2, lines 62-68, column 5, lines 1-6).

On claim **36** '073 discloses: A device as defined in claim 35, wherein said shield is a thin-wall body of revolution with the diameter not less than $5d_{max}$ which is spaced from the nearest to the plasma cathode end of said anode-enhancer by the distance up to $20d_{max}$, where d_{max} is a maximum cross-sectional dimension of the anode-enhancer (column 2, lines 62-68, column 5, lines 1-6).

On claim **37** '073 discloses: A device as defined in claim 36, wherein said thin-wall body of revolution has a flat or concave surface at the side of said anode-enhancer (column 2, lines 62-68, column 5, lines 1-6).

As best as can be understood because of the indefiniteness as discussed above, on claim **38** '073 discloses: An axisymmetric plasma cathode for the relativistic vacuum diode having a current-conductive rod for connection to a pulsed high-voltage power source and a dielectric end element (column 1, lines 18-23, column 2, lines 42-63, column 3, lines 1-63), the perimeter of the rear end of said dielectric element embraces

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the perimeter of said rod with a continuous gap at least in the plane perpendicular to the axis of symmetry of the cathode (column 3, lines 18-39, column 4, lines 63-68).

On claim **39** '073 discloses: A cathode as defined in claim 38, wherein said current-conducting rod is pointed and said dielectric end element is provided with an opening for setting on said rod the setting part of which is located together with the pointed end inside the said opening (column 3, lines 18-39, column 4, lines 63-68).

On claim **40** '073 discloses: A cathode as defined in claim 39, wherein said dielectric end element has a blind opening (column 3, lines 18-39, column 4, lines 63-68).

On claim **41** '073 discloses: A cathode as defined in claim 39, wherein said dielectric end element has a through opening (column 3, lines 18-39, column 4, lines 63-68, column 5, lines 1-6).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability

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shall not be negated by the manner in which the invention was made.

12. Claims **42-45** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent # 4,213,073 ('073) in view of Bykov et al., "Development of Long-lifetime Cold Cathodes", Technical Physics Letters, v. 25, (11), 71-74, 1999, (Bykov).

As best as can be understood because of the indefiniteness as discussed above, considering independent Claim **42** '073 discloses as detailed above all limitations of claim 38.

'073 does not necessarily teach the limitation "said dielectric end element is made of a material selected from the group consisting of carbon-chain polymers with single carbon-to-carbon bonds, paper-base laminate or textolite type composite materials with organic binders, ebony wood, natural or synthetic mica, pure oxides of metals belonging to III-VII groups of the periodic table, inorganic glass, sitall, basalt-fiber felt and ceramic dielectrics".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Bykov, drawn to the relativistic electron beam generation, hence analogous art who teach: composition cathodes with incomplete electric discharge over the dielectric surface (page 73, lines 32-33, page 74, lines 1-3).

Motivation for said inclusion derives from Bykov: "To increase the lifetime of cold cathodes, page 73, lines 32-33)".

On claim **43** '073 discloses all limitation of claim 38 as detailed above.

'073 does not necessarily teach the limitation "said dielectric end element has a developed surface".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Bykov, drawn to the relativistic electron beam generation, hence analogous art who teach: cathode with dielectric end element having a developed surface (Fig. 5, page 74, lines 2-6).

Motivation for said inclusion derives from Bykov: "To increase the lifetime of cold cathodes, page 73, lines 32-33)".

On claim **44** '073 discloses all limitation of claim 39 as detailed above.

'073 does not necessarily teach the limitation "said dielectric end element has a developed surface".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Bykov, drawn to the relativistic electron beam generation, hence analogous art who teach to cathode with dielectric end element having a developed surface (Fig. 5, page 74, lines 2-6).

Motivation for said inclusion derives from Bykov: "To increase the lifetime of cold cathodes, page 73, lines 32-33)".

On claim **45** '073 discloses all limitation of claim 40 as detailed above:

'073 does not necessarily teach the limitation "said dielectric end element has a developed surface".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Bykov, drawn to the relativistic electron beam generation, hence analogous art who teach to cathode with dielectric end element having a developed surface, Fig. 5, page 74, lines 2-6).

Motivation for said inclusion derives from Bykov: "To increase the lifetime of cold cathodes, page 73, lines 32-33)".

13. Claims **46-47** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent # 4,213,073 ('073) in view of Korenev, patent SU 1545826 (Korenev).

On claim **46** '073 discloses all limitation of claim 38 as detailed above.

'073 does not necessarily teach the limitation "said minimum cross-sectional dimension of said dielectric element is $C_{de\ min} = (5-10) C_{cr\ max}$, and the length of said element is $l_{de} = (10-20) C_{cr\ max}$, where $C_{cr\ max}$ is a maximum cross-sectional dimension of the current-conducting rod.

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Korenev, drawn to the relativistic electron beam generation and material processing by electron beam, hence analogous art who teach this limitation (Abstract, Fig. 1, page 1, lines 15-23, page 2, lines 17-31).

Motivation for said inclusion derives from Korenev: "For improve a functional possibilities of electron beam generation (Abstract, page 1, lines 14-15)".

On claim **47** '073 discloses all limitation of claim 39 as detailed above.

'073 does not necessarily teach the limitation "said minimum cross-sectional dimension of said dielectric element is $C_{de\ min} = (5-10) C_{cr\ max}$, and the length of said element is $l_{de} = (10-20) C_{cr\ max}$, where $C_{cr\ max}$ is a maximum cross-sectional dimension of the current-conducting rod".

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include said limitation in view of Korenev, drawn to the relativistic electron beam generation and material processing by electron beam, hence analogous art who teach this limitation (Abstract, Fig. 1, page 1, lines 15-23, page 2, lines 17-31).

Motivation for said inclusion derives from Korenev: "For improve a functional possibilities of electron beam generation (Abstract, page 1, lines 14-15)".

Conclusion

14. The following references are cited for disclosing related limitations of the applicant's claimed and disclosed invention:

K. Zelenskii et al., "Effects of electron impact on the anode of pulsed X-ray tube", Sov. Phys.-Tech. Phys., v.13, No 9, 1284-1289, 1969.

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15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vadim Dudnikov whose telephone number is 571- 270-1325. The examiner can normally be reached on 8:00 - 17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached, Mon-Fri 7:00am-4:00 pm, at telephone number 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Patent Examiner.



Vadim Dudnikov

May 5, 2007.

Primary Patent Examiner:



Johannes Mondt

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